

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



In re Application of

Tokuju OIKAWA et al.

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For: PHOTOTHERMOGRAPHIC MATERIAL

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DECLARATION UNDER 37 CFR 1.132

Honorable Commissioner of Patents and Trademarks,
Washington, D.C. 20231

Sir:

I, Tokuju OIKAWA, a Japanese citizen, working at No.210, Nakanuma Minami-ashigara-shi, Kanagawa 250-0128 Japan, hereby declare and state that I received a Master's Degree from Tohoku University, Faculty of Engineering, Course of Applied Physics in March of 1989, and I was employed by Fuji Photo Film Co., Ltd. in April of 1989 and since that time I have been principally engaged in research and development of silver halide photographic materials, particularly emulsions used therein, at the Ashigara Research Laboratories of said company.

I declare further that I am the inventor of the subject matter of the claims in the above-identified application and I have read all of the documents contained in the file wrapper of the above-entitled application.

I declare further that the test described below was conducted at my

direction and under my supervision and the test results are true and correct to the best of my knowledge.

EXPERIMENT AND RESULTS

Photothermographic materials shown in the following table were prepared and evaluated in the same manner as described in Example 1-1 of the present specification. Sample Nos. 1-1 to 1-6 are identical to those having the same numbers shown in Example 1-1.

Compounds A-62, C-1, C-42, C-8 and C-57 satisfy item (iv) and at least one of items (i) to (iii) of Claim 1. Compounds H and 54a are hydrazine compounds, which satisfy none of items (i) to (iv).

Compound H is used in the working example of JP '447 and Compounds 54a, C-1, C-42, C-8 and C-57 are used in the working examples of Ito '084.

Results of the evaluation are also shown in the following table.

Table 17

Sample No.	Silver halide emulsion No.	Compound of the present invention	Gold compound	Developed silver grain density (%)	Covering power (%)	Sensitivity	Dmin		Dmax (25°C, 10%RH)	Variation of line width (μm)	Note
							Undeveloped	50°C, 75%RH, 3days			
1-0	A	—	—	100	100	31	0.12	0.12	1.3	11	Comparative
1-1	A	A-62	—	1800	320	100	0.12	0.13	4.0	11	Comparative
1-2	B	A-62	chloroauric acid	2100	340	213	0.20	0.31	4.2	16	Comparative
1-3	C	A-62	chloroauric acid + potassium thiocyanate	1800	320	228	0.16	0.20	4.1	13	Comparative
1-4	D	A-62	(G)	1800	320	232	0.12	0.12	4.1	8	Invention
1-6	D	—	(G)	100	100	34	0.13	0.14	1.3	11	Comparative
1-11	D	H (JP'447)	(G)	106	103	36	0.17	0.24	1.4	11	Comparative
1-12	A	54a (Ito '084)	—	1800	320	92	0.13	0.20	4.0	12	Comparative
1-5	D	54a (Ito '084)	(G)	1800	320	221	0.17	0.22	4.1	11	Comparative
1-13	A	O-1 (Ito '084)	—	1800	320	98	0.12	0.12	4.0	11	Comparative
1-14	D	O-1 (Ito '084)	(G)	1800	320	230	0.12	0.12	4.1	8	Invention
1-15	A	O-42 (Ito '084)	—	1800	320	98	0.12	0.12	3.9	11	Comparative
1-16	D	O-42 (Ito '084)	(G)	1800	320	225	0.13	0.13	4.1	8	Invention
1-17	A	O-8 (Ito '084)	—	1800	320	95	0.12	0.12	3.8	11	Comparative
1-18	D	O-8 (Ito '084)	(G)	1800	320	223	0.13	0.13	4.1	8	Invention
1-19	A	O-57 (Ito '084)	—	1800	320	98	0.12	0.12	4.0	12	Comparative
1-20	D	O-57 (Ito '084)	(G)	1800	320	230	0.12	0.12	4.0	8	Invention

Compound (A-62) is shown on page 83 of the present specification. Compound H is a hydrazine compound shown on page 33 of JP '447.

Compound 54a is a hydrazine compound shown on column 53 of Ito '084, which is identical to Compound Y shown on page 126 of the present specification.

Compounds O-1, O-42, O-8 and O-57 are shown on columns 23-32 of Ito '084.

Gold compound (G) is shown on page 28 of the present specification.

DISCUSSION

As described in Claim 1, the present invention is directed to a photothermographic material that contains photosensitive silver halide, a non-photosensitive silver salt of an organic acid, a reducing agent and a binder on one side of a support, which is particularly characterized by comprising an organic gold compound in combination with a compound of formula (1), (2) or (3) from item (iv) that satisfies at least one of items (i) to (iii).

The data in Table 17 above indicates that samples 1-4, 1-14, 1-16, 1-18 and 1-20, which are embodiments of the present invention, where organic gold compound (G) is used in combination with a compound of formula (1), (2) or (3) that satisfies at least one of items (i) to (iii), have excellent properties such as higher sensitivity, little increase of fog after long storage, higher Dmax under low temperature and low humidity, and low temperature and humidity dependency in variation of line width during development. These samples of the present invention have far superior qualities than samples 1-1, 1-2, 1-3, 1-13, 1-15, 1-17 and 1-19 which contain a compound of formula (1), (2) or (3) that satisfies at least one of items (i) to (iii) but have no organic gold compound, and samples 1-6, 1-11 and 1-5 which contain an organic gold compound but have no compound of formula (1), (2) or (3). It is clearly proved that the superior properties of the present invention can be achieved by using both the organic gold compound and the compound of formula (1), (2) or (3) that satisfies at least one of items (i) to (iii) in a photothermographic material.

It should particularly be noted that the low temperature and humidity dependency in variation of line width during development, that is achieved by the present invention, is not described nor suggested in any of

the cited references, i.e. Ito '084, JP '447, Eshelman '637, Lok '112 and Lok '270. I believe that no one skilled in the art reading these cited references could have predicted that the photothermographic materials containing a gold compound and a compound of formula (1), (2) or (3) that satisfies at least one of items (i) to (iii) have the low temperature and humidity dependency during development, before the present invention was made. The low temperature and humidity dependency is a new and unpredictable finding of the undersigned.

It should also be noted that photothermographic materials containing a hydrazine compound (samples 1-11, 1-12 and 1-5) have inferior properties although Ito '084 recommends hydrazine compounds as well as compounds of formula (1) to (3) as useful nucleating agents. I believe that no one skilled in the art could have predicted that compounds of formula (1) to (3) only create the superior properties of the present invention when combined with an organic gold compound, but hydrazine compounds do not.

I also believe that no one skilled in the art would have been motivated to select the organic gold compounds among numerous kinds of sensitizing compounds and combine the organic gold compounds with the compounds of formula (1), (2) or (3) that satisfies at least one of items (i) to (iii), before the present invention was made. In case he had happened to consider using these compounds in a photothermographic material, he could not have predicted that the resultant photothermographic material has the superior properties of the present invention such as low temperature and humidity dependency. I believe that the present invention is patentable over the cited references.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application of any patent issuing thereon.

Dated this 3/~~7~~ day of October, 2003.

Tokuju Oikawa

Tokuju OIKAWA